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GUIDANCE DOCUMENT ON IDENTIFYING CONSERVATION PRIORITIES AND PHRASING CONSERVATION OBJECTIVES FOR LARGE OCEAN MANAGEMENT AREAS

Figure 1: Department of Fisheries and Oceans' (DFO) six administrative regions.

Context:

Under the Ocean Action Plan I (OAP-I), five Large Ocean Management Area (LOMA) initiatives were established: in Pacific North Coast (PNCIMA), Beaufort Sea, Gulf of St. Lawrence (GOSLIM), Eastern Scotian Shelf (ESSIM), and Placentia Bay/Grand Banks (PBGB). A key product for the Science component of the LOMA initiative is Conservation Objectives. Conservation Objectives are intended to guide participants in the Integrated Management process by setting the bounds within which the Social, Cultural and Economic Objectives are established in the LOMA, thus ensuring that the nature and magnitude of human impacts on ecosystems are sustainable.

Participants in the five LOMAs have followed general national guidelines to prepare for the identification of the Conservation Objectives. However, it was necessary for participants in each LOMA process and Headquarters to meet together prior to the step of actually identifying the LOMA-specific Conservation Objectives. The objective of the meeting was to ensure that the components of the process were being interpreted in consistent ways across the LOMAs, and that similar considerations would be reviewed in the process of identifying Conservation Objectives within each LOMA. The meeting produced the following conclusions and general guidance.

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SUMMARY

- Candidate conservation priorities for the Large Ocean Management Areas (LOMAs) are derived from the lists of Ecologically and Biologically Significant Areas (EBSAs), Ecologically Significant Species and Community Properties (ESSs and ESCPs), Depleted or Rare Species, and Degraded Areas identified for each area.

- With regard to coastal areas, it is legitimate to simply define the LOMA boundary to not include the coast, if this meets the needs of the Integrated Management process. If the LOMA includes the coastal area, *first* consider the list of ESSs that have been identified and see how well ecological functions for coastal ecosystem have been protected. If there are significant gaps in protection, then specific EBSA sites (e.g. key specific estuaries) should be added to the list of conservation priorities. If it is not possible to identify site-specific EBSAs, then it is sufficient to list generic habitat descriptions.

- The list of Depleted or Rare Species for each LOMA should include most or all Depleted species (species whose abundances have been greatly reduced from historic levels) and only those rare species that are uncommon overall *and* not very widespread.

- The list of Degraded Areas for each LOMA should include areas heavily impacted by human activities only if the case can be made that these areas cannot serve ecological functions on EBSA or ESS scale, and the loss of the function affects ecologically significant species and areas. The list should also include those areas that some competent regulatory authority has declared to be both degraded and in need of rehabilitation.

- It is unrealistic to expect to rank all individual species and areas from highest priority to least high priority. However there should be an attempt in each LOMA to at least identify a top tier of conservation priorities.

- Assignment of conservation priorities to the highest priority tier would give highest priority to EBSAs that:
    - have ecological rationales that are similar to rationales of some identified Ecologically Significant Species, Depleted or Rare Species, or Degraded Areas from the same LOMA,
    - are significant to several ecological layers, and/or
    - meet several EBSA criteria.

- If some key species or community properties that **regulate** ecosystem function are not "adequately" covered by the highest tier priority EBSAs, then add the necessary ESSs or ESCPs to the tier of highest conservation priorities.

- Once the conservation priorities are identified and, if appropriate assigned to tiers, it is necessary to express them as Conservation Objectives.

- The specificity in phrasing of a final Conservation Objective should be sufficient that it should be possible to select an appropriate indicator(s) and reference point(s) with no additional unpacking.[1]

[1] Unpacking is the process of refining objectives to successively more specific levels (CSAS Proceedings 2001/09).

- Where possible Conservation Objectives should use language that directly corresponds to language in policies, regulations, and legislation that already exists.

- The best strategy for ensuring that the phrasing of the Conservation Objectives has the desired properties described above is to tie them very closely to the criteria which they meet for qualifying as an EBSA, ESS, ESCP, Depleted or Rare Species or Degraded Area. Wording templates are provided to correspond to each criterion of each type of conservation priority.

BACKGROUND

Work teams from the five LOMAs were individually tasked to produce lists of four types of conservation issues in their areas.

Ecologically and Biologically Significant Areas (EBSAs) – An EBSA is an area that has particularly high Ecological or Biological Significance, and should receive a greater-than-usual degree of risk aversion in management of activities in order to protect overall ecosystem structure and function within the LOMA. CSAS SAR 2004/006 has criteria and guidelines for identifying EBSAs, and discusses their role in management.

Ecologically Significant Species and Community Properties (ESSs and ESCPs) – An ESS is a species that has particularly high Ecological or Biological Significance, and should receive a greater-than-usual degree of risk aversion in management of activities in order to protect overall ecosystem structure and function within the LOMA. CSAS SAR 2006/041 has criteria and guidelines for identifying ESSs and ESCPs, and discusses their role in management.

To identify an area, species or community property as "ecologically significant" is to conclude that if the area, species, or community property were perturbed severely, the ecological consequences (in space, in time, and/or outward through the food web) would be substantially greater than an equal perturbation of most other species or community properties, although the nature of those consequences could differ greatly among specific cases.

Depleted or Rare Species – Depleted or Rare species are species that are both currently at a very low abundance, and usually were much more abundant at some time in the past. Because of their status, they warrant particularly risk averse management to ensure their survival and recovery. Recovery is particularly important if the species was once thought to play an important role in structure or function of the LOMA ecosystem. No separate criteria were identified for Depleted or Rare species. Rather the lists for each LOMA were to include species assessed by COSEWIC as either Threatened or Endangered, and populations assessed by DFO and found to be below the Critical – Cautious boundary in the Precautionary Approach framework (CSAS SAR 2006/023) or assessed by NAFO and found to be likely to have a biomass below B_{lim}. When the reasons for COSEWIC to assess a species as Special Concern reflect greatly reduced abundance and significant threats, such a species may also be considered a Depleted or Rare Species.

Degraded Areas – Degraded areas are areas where environmental quality has been impacted by human activities to a state where the "natural" structure and function of the ecosystem in the area is severely diminished. Both the causes and the nature of the degradation may be very different among areas and among LOMAs. No guidelines had been developed for placing areas

on this list, beyond noting that if some competent jurisdiction at the municipal, provincial or federal level (such as CEAA) had already labelled an area as degraded, it should be included on this list. Otherwise, it should be noted that "degraded" is intended to reflect areas that are *severely* impacted by human activities on scales large enough to have widespread consequences within the LOMA, and not just be used where human activities have altered an area from its pristine state.

In the process of developing these four lists of candidate conservation priorities, several operational problems were identified. To ensure consistent interpretation of categories and key terms, and consistent approaches to applying the guidelines, the following additional guidance was developed. In addition options were considered for bringing the four lists together into a single product for Oceans managers. Because of practical limits on the ability of management to pursue large numbers of Ecosystem Objectives simultaneously, the possibility of and strategies for assigning some priority among the total suite of EBSAs, ESSs, ESCPs, Depleted or Rare Species, and Degraded Areas were discussed. Conclusions of those discussions are also presented below.

Once conservation priorities are identified and, if appropriate, ranked, it is necessary to express them as Conservation Objectives. Conservation Objectives should describe states of key spatial or bio-physical components of the ecosystem. Achieving the suite of Conservation Objectives should ensure a high likelihood that key structural and functional properties of the LOMA ecosystem have not suffered serious or irreversible harm. Each Conservation Objective should be sufficiently specific that appropriate experts can identify indicators and reference points without additional "unpacking"[2]. It is not expected that Conservation Objectives would refer directly to any specific management measures or threats. However, their specificity would allow managers to have informed discussion of the threats likely to affect the likelihood of achieving the Conservation Objectives and to consider management strategies and tools that would be appropriate.

Together, this set of conclusions should be taken as general guidance for identification of conservation priorities and phrasing of those priorities as Conservation Objectives.

ANALYSIS

Interpretation of Specific Terms or Categories

Coastal Area

Operational challenges have been encountered in how coastal areas should be treated in determining conservation priorities. Issues include the following: finer spatial scale for many areas considered ecologically or biologically significant in coastal areas in contrast to the coarser scale appropriate in the offshore, differences in data density, issues in the legitimacy of extrapolating data along coastal boundaries compared to extrapolation between observations offshore, and jurisdictional complexities in coastal areas. In addition many stakeholders have expressed particularly great concern about coastal conservation and multiple use issues, and hence there is a need for enhanced management.

[2] "Unpacking" is used here in the sense of the CSAS Proceedings 2001/09: that is, the process of refining objectives to successively more specific levels.

However coastal issues are handled in the LOMA process, it was agreed that the Coastal Management Area (CMA) is a priority and should proceed as quickly as possible. In the short-term, a strategy is needed to deal with coastal areas in the LOMA process.

Options:

a) Leave coastal areas out altogether. Report that coastal areas are not well addressed by the LOMA framework and that some other framework, such as CMA, should be developed urgently.
b) Use generic designations of types of ecosystem areas or habitat types (for example estuaries or eelgrass beds), that are considered to be functionally significant. Then advise that wherever those features may be found, they may be significant and thus warrant particularly risk averse management.
c) Use a selection of significant species that capture key coastal functions (for example eelgrass, kelp) and have the role of coastal areas be featured in the conservation measures.

Choice: Merger of them all

It *is* legitimate to simply define the LOMA boundary to not include the coast, if this meets the needs for supporting the integrated management table. However, if the coastal area is included in the definition of the LOMA, and this is important to many stakeholders, then the advice provided *must* take account of coastal EBSA-like issues.

If the LOMA includes the coastal area, *first* consider the list of ESSs that have been identified and see how well ecological functions for the coastal ecosystem have been covered if the ESSs are managed in highly risk averse ways. If there are significant gaps in protection of coastal ecosystem structure and function, then the LOMA process should try to add specific sites (e.g. key specific estuaries) as EBSAs to the list of conservation priorities. If it is not possible to identify site-specific EBSAs, the fallback is to list generic habitat type descriptions (e.g. the salinity gradient or the macroalgae beds in all estuaries), with the rationale that functional properties of the whole LOMA depend on processes that occur in these sites or habitats.

Depleted or Rare Species

Operational uncertainties have arisen with regard to whether species that are inherently rare should be considered for inclusion on the list of Depleted or Rare Species, along with species that once were more abundant.

Options:

a) Do not include a species if it is just rare. The only species that should be included are ones that once were common but now have depleted abundance.
b) Include most or all depleted species and only those rare species that are uncommon overall *and* not very widespread.
c) Include most or all depleted species and most or all rare species.

Choice: B

Rationale: Depleted species may have played some important ecological functional role when they were abundant, and now are unable to do so because of reduced abundance. Hence recovery of these species is important to restoring ecosystem structure and function. Species that are rare and NOT widespread may be particularly vulnerable to harm, and therefore warrant particularly risk averse management. Species that are "typically" rare and widespread seem to be at their "usual" state and are not especially exposed to harm. Hence these latter species do not necessarily require exceptionally risk averse management.

Degraded Areas

With no criteria for identifying degraded areas, it was unclear what should be included in this list. Regardless of how Degraded Areas are addressed in the short term for setting conservation priorities, in the medium term criteria are needed for Degraded Areas, as have been developed for EBSAs and ESSs. It is also a priority to clarify what it would mean for management (in jurisdictional sense as well as the context of management actions) if an area is on the "Degraded" list.

Short-term Options:

a) Consider the scale of area and nature of the degradation. Include the area in the list of candidate conservation priorities if a science-based case can be made that the degradation is affecting the ecological function of areas, species, or community properties that have been identified as conservation priorities on any of the other criteria in the LOMA.
b) Use the idea of naturalness of the area. Consider how much an area has been altered by the activities causing the degradation, and give highest priority to areas that are most pristine.
c) Consider the cause(s) of the degradation. Base a decision to include the area on the list of candidate conservation priorities on an assessment of the cause of the stresses. Give highest priority to the areas which are most severely stressed.

Choice: Variant of A

The list of candidate conservation priorities can include degraded areas but only if the weight of evidence indicates that the area cannot serve its ecological function **on EBSA or ESS scale.** It is also necessary to be able to make a case that the weight of evidence suggests that effects of not serving that ecological function increase the risk of undesirable consequences for something that has been identified as an ESS or ESCP.

This reasoning implies that when degraded areas are considered to be conservation priorities, then the goal of management would be to restore the area to a state where it can serve that function, if feasible. If restoration is not feasible, then the management goal would be to restore that function in some other place or some other way, on the scale of the EBSA or ESS and within the same LOMA.

In addition, the list of candidate conservation priorities for degraded areas should include those areas that some competent regulatory authority has declared to be both degraded and in need of rehabilitation. In such cases the conservation goal is to achieve whatever state that the regulatory authority has tasked management to achieve.

Merger of Four Lists

The LOMA process has produced four separate lists of candidate conservation priorities: EBSAs, ESSs and ESCPs, Depleted or Rare Species, and Degraded Areas. When these candidate conservation priorities and their associated Conservation Objectives are delivered to the Integrated Management process, they have to be brought together in some way.

Options:

a) Simply concatenate the four lists and pass to management with no ranking. All entries on all lists are considered equally important from a science perspective.
b) Combine the four lists and rank the combined entries. The rankings would have to be based on some specific considerations/criteria/guidelines.

Implications of the Options:

The overall framework assumes that managers are to be more risk averse for *all* species and areas on that combined list than they are when merely trying for sustainability of use.

However, if **a)** is chosen then:

- A very large fraction of the ecosystem (the aggregate area of all EBSAs *and* in addition all ESSs and ESCPs that are not place-based) will be designated as requiring highly risk averse management.
- With no ranking of priorities among the total list of species and areas, *de facto* managers are asked to provide an equal level of risk aversion to each individual candidate conservation priority.
- To allow a reasonable amount of human use to proceed in the LOMA, a realistically achievable level of risk aversion will result in the presence of some threat to all priorities.

If **b)** is chosen then:

- The science advice would request or guide managers to be exceptionally risk averse relative to highest priorities.
- The science advice would mean that the lowest priority species and areas would be likely to be at higher risk than they would be under a). However, by being on a list as a conservation priority at all, they should still be at less risk than if they had not been identified at all as an EBSA, ESS, ESCP, Depleted or Rare Species or Degraded Area.

Choice: Variant of b)

It was agreed that it was unrealistic to expect to ever be able to rank all the individual species and areas from highest priority to least high priority. However it was also agreed that there should be an attempt in each LOMA to at least identify a top tier of conservation priorities. These would be the ecological properties considered most essential for the natural structure and function of the ecosystem, and the properties where management should be least willing to accept risks during the Integrated Management consultation and negotiation process. The LOMA-specific processes would not be restricted to just two tiers of conservation priorities if the information was considered sufficient to identify more than two, but it was considered very unlikely that more than a small number of tiers could be identified.

Given this choice, there is a need for explicit **considerations/criteria/guidelines** to use for assigning candidate conservation priorities to a tier.

Options:

a) Assign higher priority to species and places where there is already special **legal status** for conservation (degraded areas and many Depleted or Rare species).
b) Make **EBSAs** higher priority than other candidate properties because if ecologically and biologically significant places are protected, then there is a high likelihood that species and functions will be as well.
c) Assign higher priority to places and species if the same ecological concept/function is the rationale for a species and an area being present on **multiple** lists.
d) Use just EBSAs and ESSs as conservation priorities. Then order entries within these categories by using the level of depletion (species) and degradation (areas) as a **weighting** factor.
e) Assign higher priority to entries that met the criterion for **uniqueness**.
f) Assign higher priority to entries that met the criterion for **naturalness**.
g) Assign higher priority to the places and species for which some scientific evidence (data, conceptual or computer models, etc.) suggests they **regulate** the structure and function of the ecosystem.
h) Assign higher priority to places and species where **recovery from harm** would be considered to be particularly difficult.
i) Assign higher priority to areas that are particularly at risk of harm.

Choice: Combination of b), c) and g)

Assignment to the highest priority tier would proceed as follows:

1. Specify the **rationale** for each entry on each list. That rationale is partly the criterion(a) that was (were) met by the entry, but the more important consideration is how exceptionally risk averse protection of the property would contribute to protecting ecosystem structure and function. This information should be available from the process which produced the lists to begin with, and is a precursor to applying criteria such as c) and g).

2. Then start with criterion b), taking all EBSAs, and categorize them by considering criterion c) (multiple criteria/layers/lists). The concept of "multiple lists" has three aspects.

- The first is having a similar ecological rationale for separate entries in the lists of EBSAs, ESSs, ESCPs, Depleted or Rare Species, and Degraded Areas. For example, an EBSA might be justified by a large sponge reef presenting important three-dimensional habitat for many species, and the same species might be listed as an ESS because it provides three-dimensional habitat structure.
- The second is that in a layering exercise of information from several types of ecosystem properties, the same area appears as ecologically significant for many layers. For example, the same area may be ecologically significant for oceanographic features, phytoplankton productivity, zooplankton productive, fish and invertebrate diversity, and marine mammal feeding.
- The third is that even for a single ecosystem layer, an area meets several of the criteria for being an EBSA (CSAS 2004/006). For example, the area may be unique, as well as a major aggregation centre for a group of species, and/or the activities performed there have important fitness consequences.

The highest tier conservation priorities would show all three of these aspects of "appearing on multiple lists."

3. Then take the output of step 2, and consider these highest spatial conservation priorities. Apply g), considering the features that, with available information and according to the EOAR, are thought to be most important in **regulating** functional dynamics of the ecosystem(s) in the LOMA. If some key species or community properties that regulate ecosystem function are *not* "adequately" covered by the highest tier priorities from step 2, then add the necessary ESSs or ESCPs to the tier of highest conservation priorities.

More than two tiers can be created using this process, if the participants in the process feel there is adequate information to do so.

Phrasing of Conservation Objectives

The conservation priorities should be expressed as Conservation Objectives, to be useful in the Integrated Management process. General guidance on ecosystem objectives was provided in CSAS Proceedings 2001/09. However, more specificity in how Conservation Objectives are phrased is needed for the various LOMA teams to ensure that the same guidance to management is phrased the same way in all cases. *Conservation Objectives are supposed to describe the state of the ecosystem property (area, species, or community property) if the Conservation Objective is being achieved by management, and not describe the management action or tool that is expected to be applied.*

A Conservation Objective should be sufficiently specific that it is possible to select appropriate indicator(s) and reference points with no additional unpacking. Additional science advice will likely be required with regard to which indicators are the best measures of status of the ecosystem relative to the state, and which reference point values correspond to the conservation goals. However, the science task for determining indicators and reference points should be clear from the statement of the Conservation Objective.

It was also agreed that where possible, management actions would benefit from the Conservation Objectives using language that directly corresponded to language in policies, regulations, and legislation that already existed. This would both make the necessary actions by managers clear, and provide a regulatory basis for management taking those actions. It would also allow the dialogue in the Integrated Management planning process to use the same language in discussing the Conservation Objectives to be achieved and the tools available for use in their achievement.

Further, it was agreed that the best strategy for ensuring that the phrasing of the Conservation Objectives had the desired properties described above was to tie them very closely to the criteria which they had met as qualifying as an EBSA, ESS, ESCP, Depleted or Rare Species or Degraded Area. Consequently the following templates are proposed for use. These may be adapted as necessary in applications to ensure the statements are clear and as simple as possible. However, the closer the phrasing adheres to these templates, the easier it will be to avoid misunderstandings when others use these Conservation Objectives.

Ecologically and Biologically Significant Areas

UNIQUENESS
Ensure that the features which make an area unique are not altered by human activities.

- Note: This is intentionally a particularly prescriptive phrasing of the Conservation Objective. For areas which are truly unique, any form of human-induced perturbation of the unique properties should be prevented.

AGGREGATION
Ensure that the features that make the area suitable for aggregation are not disrupted by human activities.

- Note: This is intentionally a less prescriptive phrasing than under Uniqueness. "Not disrupted" means that some degree of alteration of the area or population would be permissible, as long as the weight of evidence suggests that the area or species can continue to serve the ecological function(s) reflected in the criterion(a).

For both Uniqueness and Aggregation, the science advice at the Integrated Management (IM) planning stage would include identifying the specific features being referred to, how those features would be measured as indicators, and which positions on the indicators would be reference points for management. Where the Uniqueness or Aggregation is known to be due to a particular ecosystem feature at the time the Conservation Objective is being set, it would be reasonable to specify the feature directly in the Conservation Objective, in place of "the features."

FITNESS CONSEQUENCES
Ensure that reproduction and survival of the dependent species in that area are not disrupted by human activities.

The science advice at the IM planning stage would include identifying the species features being referred to, how those features would be measured as indicators, and which positions on the indicators would be reference points for management.

The other two EBSA criteria, naturalness and resilience, are modifiers of the three core criteria (above). They should be used in the assignment of candidate conservation priorities to tiers or ranks, but would not be stated as objectives in themselves.

Ecologically Significant Species and Ecologically Significant Community Properties

KEY TROPHIC SPECIES

Forage/prey species
Ensure that [the species] is not perturbed by human activities to the point where it is unable to fulfill its role as important food supply within the ecosystem.

- Note "perturbed" is used in these contexts to give substantial generality to the application of the guidelines. Perturbance that may have ecological consequences can include increases or decreases in abundance, changes in spatial or seasonal distribution, and other kinds of alternations that need to be assessed on a case by case basis.

Highly influential predator
Ensure that [the species] is not perturbed by human activities to the point where it is unable to fulfill its role as a highly influential predator.

Nutrient import/export
Ensure that [the species] is not perturbed by human activities to the point where it is unable to fulfill its role as a nutrient importer/exporter in the ecosystem.

In all cases the science advice at the IM stage would specify the indicators for how the status of the species would be measured, and what position on the indicator would correspond to being able to play the specified ecosystem function.

STRUCTURE PROVIDING SPECIES
Ensure no net loss, due to human activities, of structural habitat provided by the species.

The science advice at the IM stage would specify the indicators for how the status of the habitat provided by the species would be measured.

PROPERTIES ABOVE SPECIES LEVEL

Size-based properties
Frequency distribution of abundance/biomass
It was considered premature to develop templates for stating Conservation Objectives for these ecosystem properties. There is no doubt that these properties can be altered to states which represent serious or irreversible harm to ecosystem structure and function. However, further scientific investigations will be needed before it will be possible to specify the states of these community properties that correspond to appropriate management goals and conservation limits.

SPECIES FOR CONTROL

Invasive species
Prevent non-authorized introduction of invasive species. (This is intentionally generic with regard to which species.)
Control the spread and abundance of [name of specific existing invasive species from the ESS list].

The science advice necessary at the IM stage was not discussed, but the science advisory framework for invasive species is under active development.

Harmful and toxic species
Control the spread and abundance of [name of harmful and toxic species from the ESS list].

The science advice necessary at the IM stage was not discussed, but the science advisory framework for harmful and toxic species is under active development.

Depleted or Rare Species

RARE
Ensure survival of [the species].

DEPLETED
Ensure survival and recovery of [the species].

The science advice needed at the IM stage would be the advice routinely provided for species assessed as in need of recovery, or from a Recovery Potential Assessment for a species assessed by COSEWIC as Threatened or Endangered.

Degraded Areas

In cases where a degraded area is included as a candidate conservation priority because the area cannot serve its ecological function **on EBSA or ESS scale,** and the effects of not serving that function can be tied to increasing risk to something that has been identified as an ESS or ESCP then:

- The Conservation Objective is to restore the area to a state where it can serve that function, if feasible. Where restoration of the specific area is not feasible, restore that function on the scale of the EBSA or ESS within the LOMA.

In cases where a degraded area is included as a candidate conservation priority because some other regulatory authority has declared the area degraded, then:

- The Conservation Objective is to achieve whatever state of restoration the regulatory authority has tasked management to achieve.

In the first case, the science advice necessary at the IM stage is specification of the ecosystem functions that are not currently being served in the area, indicators of status that reflect the level of performance of that function, and indicators of the state necessary for the function to be served.

In the second case, the science advice necessary will be determined by the guidance provided by the regulatory authority that declared the area in need of rehabilitation.

CONCLUSIONS AND ADVICE

Next Steps

The guidance in this document should be followed when LOMAs are setting the science-based Conservation Objectives. Within the coming year, the entire framework is expected to be reviewed and adapted according to the lessons learned from the LOMA experiences.

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